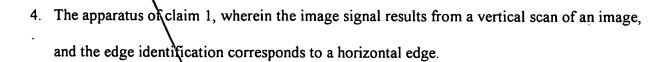
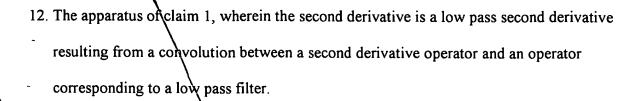
We claim

- 1. Apparatus for edge detection comprising:
- means for receiving an image signal;
- means for first detecting whether a second derivative of the image signal crosses zero;
- means for, in response to a positive result from the first means for detecting, second detecting whether a first derivative of the image signal is greater than a first threshold;
- means for, in response to a positive result from the second means for detecting, third detecting whether an indication of an edge frequency is meets a predetermined criterion; and
- means for supplying an edge identification in response to a positive result from the third means for detecting.
- 2. The apparatus of claim 1, wherein
- the image signal comprises a luminance signal;
- the indication of the edge frequency is a ratio between a third derivative of the luminance signal and a first derivative of the luminance signal and
- the predetermined criterion is whether the ratio is greater than a threshold.
- 3. The apparatus of claim 2, wherein the third derivative is low-pass as a result of being calculated from a low-pass second derivative.



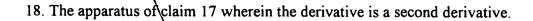
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- 5. The apparatus of claim 1, wherein the image signal results from a horizontal scan of an image, and the edge identification corresponds to a vertical edge.
- 5 6. The apparatus of claim 1, wherein the image signal comprises a luminance signal and the second derivative is a low-pass second derivative.
 - 7. The apparatus of claim 1, wherein the image signal is a luminance signal and the first derivative is a low-pass first derivative.
 - 8. The apparatus of claim 1, comprising a medium, readable by a data or signal processing device, embodying code adapted to effect the listed operations.
 - 9. The apparatus of claim 1, comprising at least one special purpose hardware unit adapted to perform the listed operations.
 - 10. The apparatus of claim 9, further comprising a separate respective special purpose hardware unit adapted to perform each of the detecting operation.
- 11. The apparatus of claim 1, wherein the image is a video image and the image signal is a luminance signal.



- 13. The apparatus of claim 12, wherein the operator corresponding to the low pass filter is of the form [1, 2, ..., m, ..., 2, 1], where m is an integer variable relating to an up-scaling factor applied to the video signal prior to edge detection.
- 14. The apparatus of claim 13, wherein an operator corresponding to the low pass second derivative is of the form [-1, 0, 0, 0, 2, 0, 0, -1]
- 15. The apparatus of claim 1, wherein the first derivative is a low-pass derivative resulting from a convolution between a derivative operator and an operator corresponding to a low pass filter. The apparatus of claim 12, wherein the low pass filter is of the form [1, 1, 1]
- 16. The apparatus of claim 1, further comprising an edge linking unit.
- 17. Image processing apparatus comprising:
- an input for receiving an image related signal;
- a means for effecting a combined low pass filter and derivative operation, without separating the two operations; and
 - an output for providing a result of the combined low pass filter and derivative operation.

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- 19. The apparatus of claim 18, wherein the derivative is a first derivative.
- 20. A method for edge detection comprising executing the following operations in a data or signal processing device:
- receiving an image signal;
- first detecting whether a second derivative of the image signal crosses zero;
- in response to a positive result from the first detecting, second detecting whether a first derivative of the image signal is greater than a first threshold;
- in response to a positive result from the second detecting, third detecting whether an indication of an edge frequency meets a predetermined criterion; and
- supplying an edge identification in response to a positive result from the third detecting.
- 21. The method of claim 20, wherein
- the image signal comprises a luminance signal;
- the indication of the edge frequency is a ratio between a third derivative of the luminance signal and a first derivative of the luminance signal; and
- the predetermined criterion is that the ratio is greater than a threshold.
- 22. The method of claim 21, wherein the third derivative is low-pass as a result of being calculated from a low-pass second derivative.

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- 23. The method of claim 20, wherein the image signal results from a vertical scan of an image, and the edge identification corresponds to a horizontal edge.
- 24. The method of claim 20, wherein the image signal results from a horizontal scan of an image, and the edge identification corresponds to a vertical edge.
- 25. The method of claim 20, wherein the image signal comprises a luminance signal and the second derivative is a low-pass second derivative.
- 26. The method of claim 20, wherein the image signal is a luminance signal and the first derivative is a low-pass first derivative.
- 27. The method of claim 20, comprising effecting the operations in response to a medium, readable by the data or signal processing device and embodying code.
- 28. The method of claim 20, comprising effecting the operations in at least one special purpose hardware unit.

- 29. The method of claim 20, wherein the at least one special purpose hardware unit comprises a separate respective special purpose hardware unit adapted to perform each of the detecting operations.
- 30. The method of claim 20, wherein the image is a video image and the image signal is a luminance signal.
- 31. The method of claim 20, wherein the second derivative is a low pass second derivative resulting from a convolution between a second derivative operator and an operator corresponding to a low pass filter.
- 32. The apparatus of claim 31, wherein the operator corresponding to the low pass filter is of the form [1, 2, ..., m, ..., 2, 1], where m is an integer variable relating to an up-scaling factor applied to the video signal prior to edge detection.
- 33. The method of claim 32, wherein an operator corresponding to the low pass second derivative is of the form [-1, 0, 0, 0, 2, 0, 0, -1]
- 34. The apparatus of claim 20, wherein the first derivative is a low pass derivative resulting from a convolution between a derivative operator and an operator corresponding to a low pass filter. The apparatus of claim 12, wherein the low pass filter is of the form [1, 1, ..., 1].
- 35. The method of claim 20, further comprising an edge linking unit.

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- 36. Image processing method comprising executing the following operations in a data processing device:
 - receiving an image related signal;
 - effecting a combined low pass filter and derivative operation, without separating the two operations;
 - providing a result of the combined low pass filter and derivative operation.
 - 37. The method of claim 36, wherein the derivative is a second derivative.
 - 38. The method of claim 36, wherein the derivative is a first derivative.
 - 39. Edge detection apparatus comprising:
 - an input adapted to receive an image signal;
 - processing apparatus adapted
 - to detect at least one edge in the image signal; and
 - to distinguish edges having higher frequency content from edges having lower frequency content; and
 - an output arranged to supply an edge detection indication only in response to edges having higher frequency content.

